first and second means for heating an upper wall and a lower wall of the duct to a temperature substantially higher than ambient temperature, the first and second means for heating each including a resistive element and an independent voltage supply, the first and second means for heating extending above and below the substrate, and outside the duct, the upper and lower surfaces of the substrate being heated by radiation of heat from at least one well of the duct; and

means to emit compounds in a gaseous form into the duct.

REMARKS

In response to the above-identified Office Action, Applicant amends the application and seeks reconsideration thereof. In this response, Applicant amends claim 6. Applicant cancels claim 7. Applicant does not add any new claims. Claims 1-5 remain withdrawn from consideration. Claims 1-21 remain pending in the application of which claims 6 and 8-21 remain to be examined.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attachment is captioned "Version With Markings To Show Changes Made."

I. Objections to the Claims

Claim 17 stands objected to under 37 C.F.R. 1.75(c) as being in improper dependent form for failing to further limit the subject matter of a previous claim. Applicant has amended claim 6. Claim 6, as amended, claims a first and second heating means. Applicant notes that claim 17 claims the first and second means for heating form only a single heating device which is not contradictory to the fact that the voltage supply is independent for each of the first and second heating means. Thus, Applicant believes claim 17 further limits the structure claimed in claim 6 of the first and second heating means by limiting the relation of the first and second heating means without contradicting the language claim 6 claiming an independent voltage supply for the first and second means for heating. Accordingly, reconsideration and withdrawal of the objection to claim 17 are requested.

II. Claims Rejected Under 35 U.S.C. § 112

Claims 12 and 20 stand rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a manner as to reasonably convey to one skilled in the art the inventor at the time the application was filed in relation to the claimed invention. Applicant respectfully disagrees for the following reasons.

In regard to claim 12, the Examiner states that the specification and drawings do not teach supplying a gas via the duct to equalize pressure between the duct and tube as claimed in claim 12. Applicants point the Examiner to page 15, lines 3-7 of the specification. This section of the specification clearly teaches the elements of claim 12, namely that disks 18 and 19 "allow passage of gases coming from the outlet of the duct 6, between the internal space of the duct 6 and the space lying between the duct 6 and the tube 3." Accordingly, reconsideration and withdrawal of the non-enablement rejection of claim 12 are requested.

In regard to claim 20, the Examiner states that "the specification and drawings does not teach a removable duct." However, the specification at page 8, lines 36-39 clearly teaches "duct 7 may be internally lined in the hottest parts with a secondary duct made of a refractory material" as claimed in claim 20. Accordingly, reconsideration and withdrawal of the non-enablement rejection of claim 20 are requested.

III. Claims Rejected Under 35 U.S.C. § 102

Claims 6, 8-11, 16 and 18 stand rejected under 35 U.S.C. § 102(b), as being clearly anticipated by U.S. Patent No. 4,533,820, issued to Shimizu (hereinafter "Shimizu").

It is axiomatic that to anticipate a claim, each element of the claim must be disclosed in a single reference. In regard to claim 6, this claim includes the elements of a first and second means for heating an upper wall and a lower wall of the duct to a temperature. Shimizu teaches an apparatus where the walls of the duct are made of transparent quartz. See col. 3, lines 4-8. The heating means of Shimizu include heating lamps that heat the surfaces of a substance directly. See col. 3, lines 37-38. Thus, the walls of the duct of Shimizu are not heated. Rather, the walls of Shimizu do not absorb the heat and are transparent to the radiation of the heating means. Further,

the Examiner has not identified and Applicant has been unable to discern any part of Shimizu that teaches independent voltage supplies for the first and second heating means. Thus, Shimizu does not teach each of the elements of claim 6. Accordingly, reconsideration and withdrawal of the anticipation rejection of claim 6 based on Shimizu are requested.

In regard to claims 8-11, 16 and 18, these claims depend from independent claim 6 and incorporate the limitations thereof. Thus, at least for the reasons mentioned in regard to independent claim 6, these claims are not anticipated by Shimizu. Accordingly, reconsideration and withdrawal of the anticipation rejection of these claims are requested.

Claims 9-11, 16 and 18 stand rejected under 35 U.S.C. § 102(b) as being anticipated by European Patent No. 0792956A2 issued to Mayuzumi (hereinafter "Mayuzumi").

In regard to claim 6, Mayuzumi also teaches a duct where the walls are made of transparent quartz. See col. 5, lines 24-27 and col. 7, lines 29-30. Thus, the substrate is heated directly by the heating means and not by the upper and lower walls of the duct as claimed in claim 6. See col. 7, lines 40-42. Therefore, Mayuzumi does not teach each of the elements of claim 6. Accordingly, reconsideration and withdrawal of the anticipation rejection of claims 6 based on Mayuzumi are requested.

In regard to claims 9-11, 16 and 18, these claims depend from independent 6 and incorporate the limitations thereof. Thus, at least for the reasons mentioned in regard to claim 6, these claims are not anticipated by Mayuzumi. Accordingly, reconsideration and withdrawal of the anticipation rejection of claims 9-11, 16 and 18 are requested.

In regard to claims 6, 9-11, 16, 18 and 21 stand rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,253,324 issued to Wortman, et al. (hereinafter "Wortman").

In regard to claim 6, this claim include the elements of a first and sect heating means extending above and below a substrate. However, Wortman teaches a heating means 12 that extends along the sides of a treating chamber. See Figure 1. Further, the Examiner has not identified and Applicant has been unable to discern any part of Wortman that teaches the emission of compounds in a gaseous form into the duct as claimed in claim 6. Rather, the apparatus

described by Wortman is an apparatus for the heat treatment of a wafer. Therefore, Wortman does not teach each of the elements of claim 6. Accordingly, reconsideration and withdrawal of the anticipation rejection of claim 6 based on Wortman are requested.

Claims 9-11, 16, 18 and 21 depend from independent claim 6 and incorporate the limitations thereof. Thus, at least for the reasons mentioned in regard to independent claim 6, these claims are not anticipated by Wortman. Accordingly, reconsideration and withdrawal of the anticipation rejection of claims 9-11, 16, 18 and 21 are requested.

Claims 6, 16 and 18 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,759,263 issued to Nordell, et al. (hereinafter "Nordell").

In regard to claim 6, this claim includes the elements of the first and second means for heating that include a resistive element. Nordell does not teach these elements of claim 6. Rather, Nordell teaches an apparatus that includes a heating device that operates by induction. See Nordell, col. 3, lines 63-67. Thus, Nordell does not teach each of the elements of claim 6. Accordingly, reconsideration and withdrawal of the anticipation rejection of claim 6 based on Nordell are requested.

In regard to claim 16 and 18, these claims depend from independent claim 6 and incorporate the limitations thereof. Thus, at least for the reasons mentioned in regard to claim 6, these claims are not anticipated by Nordell. Accordingly, reconsideration and withdrawal of the anticipation rejection of claims 16 and 18 are requested.

Claims 6-8, 18-20 stand rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,695,567 issued to Kordina, et al. (hereinafter "Kordina").

In regard to claim 6, this claim includes the elements of a first and second heating means including a resistive element. However, Kordina teaches an apparatus including a heating device that operates by induction. See Kordina, col. 6, lines 1-2. Further, the Examiner has failed to indicate an Applicant has been unable to discern any part of Kordina that teaches an independent voltage supply for the first and second means for heating. Therefore, Kordina does not teach each

of the elements of claim 6. Accordingly, reconsideration and withdrawal of the anticipation rejection of claim 6 based on Kordina are requested.

In regard to claims 8, 18 and 20, these claims depend from independent claim 6 and incorporate the limitations thereof. Thus, at least for the reasons mentioned in regard to claim 6, these claims are not anticipated by Kordina. Accordingly, reconsideration and withdrawal of the anticipation rejection of claims 8, 18 and 20 are requested.

Claim 17 stands rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,315,479 issued to Toole, et al. (hereinafter "Toole").

In regard to claim 17, this claim depends from independent claim 6 and includes the elements of an upper and lower heating means that have independent voltage supplies as claimed in claim 17. Further, the apparatus of Toole is for the processing for oxidation for silicon wafers and is not an apparatus for chemical vapor depositions. Therefore, Toole does not teach each of the elements of claim 17. Accordingly, reconsideration and withdrawal of the anticipation rejection of claim 17 are requested.

Claims 6-8, 14, 16 and 18 stand rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,133,550 issued to Griffiths, et al. (hereinafter "Griffiths").

In regard to claim 6, this claim includes the elements of a means to emit compounds in a gaseous form into the duct. Griffiths does not teach this element of claim 6 and the Examiner has not indicated and Applicant has been unable to discern any part of Griffiths that teaches these elements of claim 6. Further, Griffiths does not teach a means for heating a lower wall duct outside of the duct as claimed in claim 6. Rather, the lower heating means of Griffiths is situated in the duct. See Figure 5 and col. 13, line 11 of Griffiths. Therefore, Griffiths does not teach each of the elements of claim 6. Accordingly, reconsideration and withdrawal of the anticipation rejection of claim 6 based on Griffiths are requested.

In regard to claims 8, 14, 16 and 18, these claims depend from independent claim 6 and incorporate the limitations thereof. Thus, at least for the reasons mentioned in regard to claim 6,

these claims are not anticipated by Griffiths. Accordingly, reconsideration and withdrawal of the anticipation rejection based on Griffth of claims 8, 14, 16 and 18 are requested.

IV. Claims Rejected Under 35 U.S.C. § 103

Claims 6, 7, 9-13 and 18 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Toole and Mayuzumi.

In order to establish a *prime facie* case of obviousness, the Examiner must show that the cited references combined teach or suggest each of the elements of a claim. In regard to claim 6, this claim includes the elements of upper and lower heating means that each have an independent voltage supply. As mentioned in regard to the anticipation rejection of claim 6, Toole does not teach these elements of claim 6. Further, the Examiner has not identified and Applicant has been unable to discern any part of Toole that teaches heating elements that heat the upper and lower wall of the duct. Applicant has been unable to discern any part of Toole that identifies the material of the vessel 8 or that the heating element 12 heat the walls of the vessel 8. Mayuzumi does not cure these defects of Toole. Mayuzumi teaches a duct that is made of transparent quartz. See Mayuzumi, col. 5, line 24. Also, Mayuzumi teaches heating units 4, 5 and 6 that directly heat the surface of the substrate on which a deposition is to occur. See Mayuzumi, col. 7, lines 40-52. Thus, Mayuzumi does not teach or suggest heating elements that heat the walls of a duct. Further, the Examiner has not indicated and Applicant has been unable to discern any part of Mayuzumi that teaches or suggests upper and lower heating elements that have independent voltage supplies. Therefore, Toole combined with Mayuzumi does not teach or suggest each of the elements of claim 6.

Further, Toole teaches a reactor using water vapor for the depositing oxides on silicon. Thus, the reactor of Toole belongs to class of reactors used for applications other than chemical vapor deposition. Mayuzumi teaches an apparatus for chemical vapor deposition. Thus, one of ordinary skill in the art would not think to combine Toole with Mayuzumi. Therefore, Toole cannot be combined with Mayuzumi to teach or suggest the elements of claim 6. Accordingly, reconsideration and withdrawal of the obviousness rejection of claim 6 are requested.

In regard to claims 9-13 and 18, these claims depend from independent claim 6 and incorporate the limitations thereof. Thus, at least for the reasons mentioned in regard to claim 6, these claims are not obvious over Toole in view of Mayuzumi. Accordingly, reconsideration and withdrawal of the obviousness rejection of claims 9-13 and 18 are requested.

Claim 15 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Griffiths (hereinafter "Griffiths") in view of U.S. Patent No. 6,002,109 issued to Johnsgard, et al. (hereinafter "Johnsgard").

Claim 15 depends from independent claim 6 and incorporate the limitations thereof. As mentioned in regard to the anticipation rejection of claim 6, Griffiths does not teach or suggest a means for emitting compounds in a gaseous form into a duct. Also Griffiths does not teach a lower heating means situated in a duct. Johnsgard does not cure these defects of Griffiths. The Examiner has not indicated and Applicant has been unable to discern any part of Johnsgard that teaches or suggests means for emitting compounds in a gaseous form into a duct or an upper heating means. Therefore, Griffiths and Johnsgard combined do not teach or suggest each of the elements of claim 15. Further, neither Griffiths nor Johnsgard teach a reactor for use in chemical vapor deposition. Thus, one of ordinary skill in the art would not think to use either of these references much less combine them in order to teach the elements of claim 15. Accordingly, reconsideration and withdrawal of the obviousness rejection of claim 15 are requested.

Claim 19 stands rejected under 35 U.S.C. 103(a) a being unpatentable over Griffiths.

Claim 19 depends from independent claim 6 and incorporates the limitations thereof. Thus, for the reasons mentioned in regard to the anticipation rejection of claim 6 and the obviousness rejection of claim 15 above, claim 19 is not obvious over Griffiths. Accordingly, reconsideration and withdrawal of the obviousness rejection of claim 19 are requested.

As mentioned above, several of the cited references disclose a duct made of transparent quartz. The aim of the transparent quartz duct is to prevent the walls of a duct from heating. For example, see U.S. Patent No. 5,108,792 issued to Anderson, et al., col. 7, lines 23-26. In ducts using transparent quartz, the substrate is heated directly by the radiation of a heating means, not by

the walls of the duct. Reactors of this type include Shimizu and Mayuzumi. A second group of reactors uses hot walls. This includes the apparatus taught by Toole, Kordina, Nordell, Griffiths and Johnsgard. One of ordinary skill in the art would understand that these two manners of heating the surface of a substrate are completely different from another and cannot be adapted to each other. Thus, one of ordinary skill in the art would not think to combine teachings of references related to one class of reactors with teachings of references from the other class of reactors.

As noted above, Applicant has pointed out that Griffiths, Johnsgard, and Wortman do not relate to chemical vapor deposition reactors. Thus, each failed to disclose a heating means or means for making gaseous compounds as claimed.

Applicant also notes that there is a further mutually exclusive categorization of the cited references between those that teach heating means that uses induction and heating means that use resistive elements. One of ordinary skill in the art would not think to combine a reference from one group with a reference from the other.

Further, one of ordinary skill in the art of the invention would not place resistive heating means in a chemical vapor deposition reactor . One reason for this is that the electrical and chemical behaviors of the resistive elements in the reactor containing the gaseous compounds were not known at the time of the invention. Another reason was that the risks of chemical polution because of the presence of resistive elements (at a temperature substantially higher than ambient temperature) were not known. Thus, it should be noted that all documents cited in the office action that disclosed means to emit gaseous compounds have heating means composed of protection lamps and quartz ducts. Toole uses a resistive means but the objective of the reactor is to deal with water vapor and there is no risk of chemical pollution. Likewise, Griffiths teaches a resistive element but does not teach means to emit gaseous compounds. Therefore, one of ordinary skill in the art would not have thought of putting resistive elements in a reactor for chemical vapor deposition because the lack of information about electrical and chemical behaviors of the resistive elements in such a reactor at the time of the invention. Thus, Applicant believes that the current set

of cited references cannot be combined in order to teach or suggest each of the elements of the invention of claims 6 and 8-21.

U.S. Patent No. 6,303,906 issued to Yoo, which is listed on the Notice of References Cited (PTO-892) was filed on November 30, 1999 after the priority date of the present application based on French application FR 9814831, filed on November 25, 1998 and thus Yoo does not constitute prior art against the present application.

CONCLUSION

In view of the foregoing, it is believed that all claims remaining to be examined, namely claims 6 and 8-21 patentably define the subject invention over the prior art of record, and are in condition for allowance and such action is earnestly solicited at the earliest possible date. If the Examiner believes that a telephone conference would be useful in moving the application forward to allowance, the Examiner is encouraged to contact the undersigned at (310) 207 3800.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: February 24, 2003

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CERTIFICATE OF MAILING:

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail with sufficient postage in an envelope addressed to: Box Non-Fee Amendment, Assistant Commissioner for Patents, Washington, D.C. 20231, on February 24, 2003.

Lillian E. Rodriguez February 24, 2003

2-24-03

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

Please amend the claims as follows:

6. (Amended) Reactor for a chemical vapor deposition of layers of a material on a substrate which extends generally in a plane, comprising:

a horizontal duct made of refractory material;

[independent] first and second means for heating an upper wall and a lower wall of the duct to a temperature substantially higher than ambient temperature, the first and second means for heating each including a resistive element and an independent voltage supply, the first and second means for heating extending above and below the substrate, and outside the duct[;], the upper and lower surfaces of the substrate being heated by radiation of heat from at least one well of the duct; and

means to emit compounds in a gaseous form into the duct.